



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/689,475	10/13/2000	Feng Liang	200-0163	7736

28549 7590 08/13/2002  
KEVIN G. MIERZWA  
ARTZ & ARTZ, P.C.  
28333 TELEGRAPH ROAD, SUITE 250  
SOUTHFIELD, MI 48034

EXAMINER

LAM, THANH

ART UNIT PAPER NUMBER

2834

DATE MAILED: 08/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.  
09/689,475

Applicant(s)  
Liang et al.

Examiner  
Thanh Lam

Art Unit  
2834



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on Jul 16, 2002.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-8, 10-15, and 17-27 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-8, 10-15, and 17-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_      6) ☐ Other:

Art Unit: 2834

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "a buried permannet magnet synchronous" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 2-6, 8, 10-15, 17-24, and 26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Jansen et al.

Regarding claims 2,10, and 17, Jansen et al. disclose a method for modifying an electric machine drive rotor having a stator to create rotor-position-dependent saliency and allow

Art Unit: 2834

sensorless control, the method comprising: providing a plurality of sensing slots (121, fig. 11) uniformly spaced (the distance between the slots 121 are uniform) around the rotor.

Regarding claims 3,11,18, Jansen et al. (Figs 17-18) disclose a sensorless control electric machine drive comprising: a stator having a plurality of stator slots; and a rotor having a plurality of rotor sensing slots (144-145, or 155, 156) located along its outer periphery, wherein said plurality of rotor sensing slots are coupled to said plurality of stator slots and wherein said plurality of rotor sensing slots are variably spaced in a repeating pattern around the outer periphery of said rotor, wherein the distance between an adjacent pair of said plurality of sensing slots is variably spaced with respect to the distance between a next adjacent pair of said plurality of sensing slots.

Regarding claim 4, said plurality of sensing slots has a uniform width and depth around the rotor.

Regarding claim 5, each of said plurality of sensing slots has a uniform width around the rotor and wherein the depth of each of said plurality of sensing slots varies in a repeating manner around the rotor.

Regarding claim 6, each of said plurality of sensing slots has a uniform depth around the rotor and wherein the width of each of said plurality of sensing slots varies in a repeating manner around the rotor.

Regarding claim 8, said plurality of sensing slots are coupled with a plurality of stator slots of the stator.

Art Unit: 2834

Regarding claims 12,19, and 22-23, said repeating pattern comprises a sinusoidal repeating pattern (see the slots 155 and 156 of fig. 18 are orderly increasing in depth).

Regarding claims 13-14, and 20-21 the depth and width of said plurality of rotor sensing slots is varied (see the depth of slots 155 and 156 of fig. 18) in a repeating pattern around said rotor.

Regarding claims 15,24 and 27, the sensorless control electric machine drive is selected from the group consisting of a sensorless control induction machine, a Lundell-type synchronous machine, a buried permanent magnet synchronous machine, and a surface permanent magnet synchronous machine.

Regarding claim 26, said plurality of sensing slots are coupled with a plurality of stator slots of a stator.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansen et al. in view of Boyer (pn. 4,485,796).

Jansen et al. disclose every aspect of claimed invention except for a post assembly step.

Art Unit: 2834

Boyer discloses a post assembly step (col. 2, lines 15-20)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the step providing sensing slots of the rotor as taught by Jansen and including a step of post assembly as disclosed by Boyer for an ease of assembly.

*Response to Arguments*

6. Applicant's arguments filed 3/14/2002 have been fully considered but they are not persuasive.

In response to applicant's argument that the reference Jensen et al. do not disclose the slots 121,122 are uniformly spaced around the rotor. The examiner submits that the fig. 11 of Jensen clearly show the spaces between the slot are uniform as rejected in claims 2,10, and 17 above.

In response to applicant's argument, regarding claims 3, 11, 18, that the reference Jensen et al. do not disclose the slots are variably spaced in a repeating pattern around the outer periphery of the rotor. The examiner submits that the fig.17 of Jensen clearly show the spaces between the slots or pair of the slots 144 are variably spaced (145) in a repeating pattern around the outer periphery of the rotor.

In response to applicant's argument, regarding claims 15,24, and 27, that the reference Jensen et al. do not disclose a buried permanent magnet synchronous. The examiner submits that the fig. 20 Jensen clearly show a buried permanent magnet (164).

Art Unit: 2834

In response to applicant's argument, regarding claim 8, that the reference Jensen et al. do not disclose the sensor slots are coupled with a plurality of stator slots of the stator. The examiner submits that the figs. 11 of Jensen clearly show the stator slots (where the winding 112 located) and the sensor slots (121).

7. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Application/Control Number: 09689475

Page 7

Art Unit: 2834

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Lam whose telephone number is (703) 308-7626. The fax phone number for this Group is (703) 305-3431.

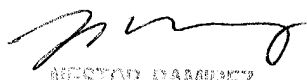
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0656.



Thanh Lam

Patent Examiner

August 8, 2002



NESTOR RAMIREZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2000